

## Fermi National Accelerator Laboratory LDRD Project Data Sheet - FY14

**Project ID:** FNAL-LDRD-2014-027

**Project title:** From Magic to Method: Characterizing High Voltage in Liquid Argon TPCs with the Breakdown in liquid argon cryostat for high voltage experiments

**Principal investigator:** Sarah Lockwitz

**Project description:** (short description and explanation of cutting edge, high-risk, high-potential science or engineering)

The project is to measure the liquid argon dielectric strength and the performance of insulators in liquid argon. The measurements and performance characterization will be done systematically over a large range of parameters relevant for current and future neutrino and dark matter experiments. No such set of comprehensive measurements on liquid argon is currently available.

**Tie to Mission:** (explain the project's relevance or anticipated benefits to Fermilab's and DOE's missions)

High voltage use in liquid argon is important for current and future projects in high energy physics including neutrino and dark matter detectors. Existing measurements of dielectric strength of liquid argon and characteristics of insulators are either unpublished, were made decades ago without control of all the relevant parameters, or are more recent measurements applicable only within limited context. The project will provide essential data that will be used in the design of the next generation liquid argon TPC devices.

**Previous year's accomplishments:** (as applicable) FY14, not applicable

**Work proposed for current fiscal year and anticipated / desired results:**

The FY14 work plan will be procure and assemble the cryogenic test stand in preparation for the set of characterization measurements of insulators in liquid argon. The first measurements are expected to be taken with high quality and demonstration that associated experimental parameters are under control.

**Project funding profile:** (costs, budgets, projected budgets, and total)

Prior year(s) costs	FY14	FY15	FY16	Total
N/A	203008	267326	-	470334